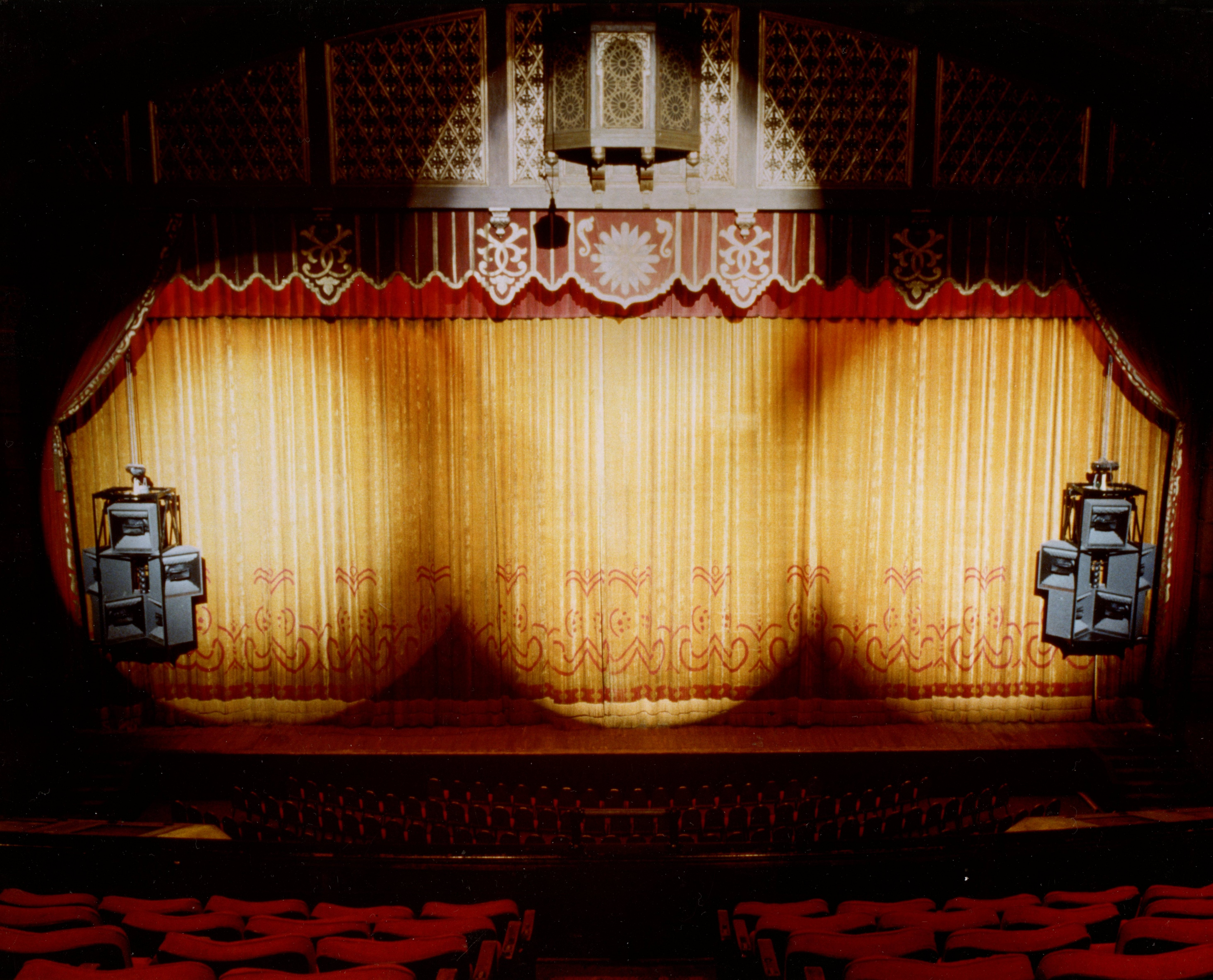
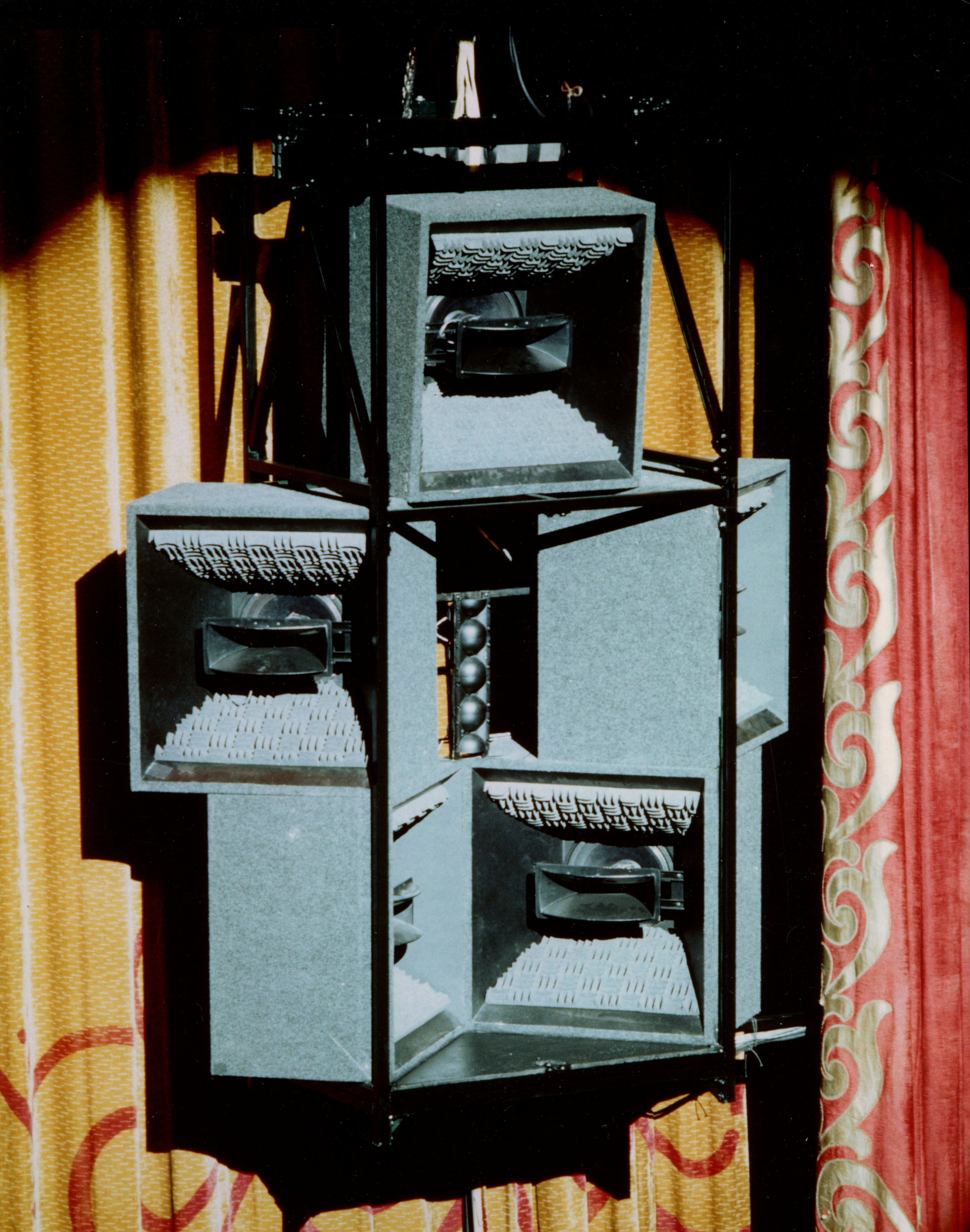
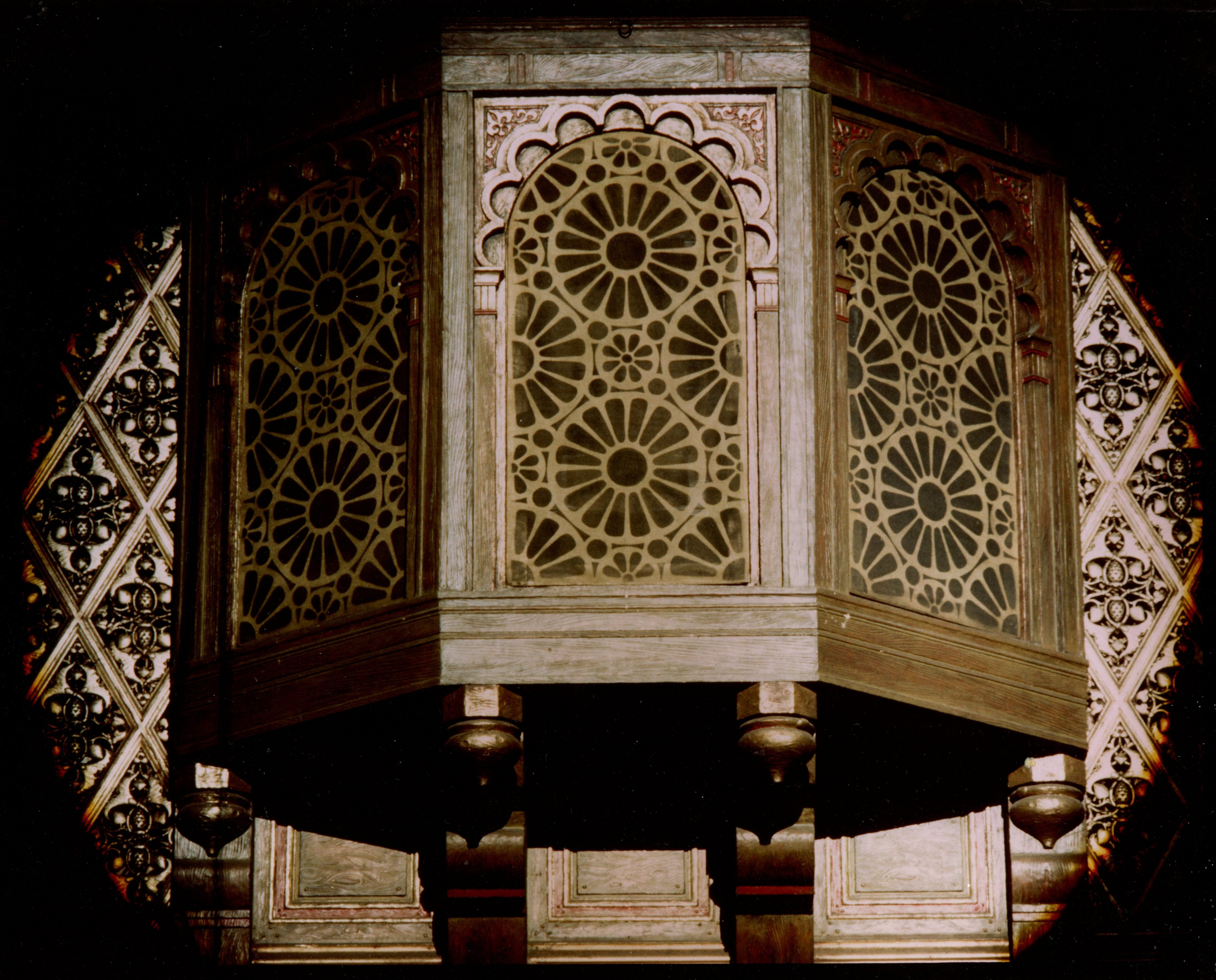
# DR. GENE PATRONIS
# FOX AUDIO 1987





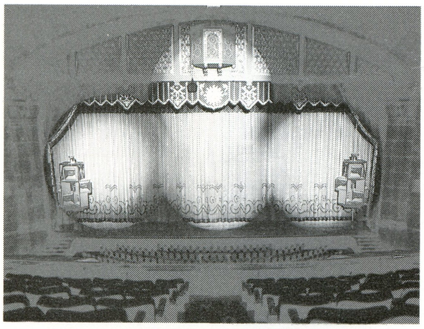


1987

# Rehabilitating the Fox

By E.T. Patronis Jr., Ph.D.

**Whenever an old theater is put through the rehab process, the necessary changes are usually followed by inevitable problems.**



*The center and side clusters as installed.*

The Fox Theatre at 660 Peachtree St. in Atlanta is one of the finest performing venues in the country. The Fox averages about 250 performances a year, covering rock concerts to grand opera.

From its original conception, the facility was headquarters for the Shriners. Financial problems in 1927 led to the sale of the facility to movie potentate William Fox. The Fox Theatre opened on Christmas Day in 1929.

For much of its history, the Fox operated as a grand movie palace, but by 1974, the changes in the movie industry had the theater doomed for the wrecking ball. Even in its declining years as a movie house, the Fox had benefited from the unselfish financial and construction efforts of appreciative citizens.

In 1963, Joe Patten, technical director of the Fox, led a 10-month campaign to restore the theater's Moller organ. This successful campaign served as an example so that when the theater was finally threatened with destruction in 1974, Patten, along with other citizens, formed Atlanta Landmarks. This non-profit organization not only saved the Fox, but also operates the theater. In addition, Atlanta Landmarks maintains an ongoing program of restoration and refurbishment. Skilled craftsmen working from original drawings and designs are slowly making up for the years of neglect and lack of maintenance that were attendant with the last chapter of the Fox's movie house-only history.

Throughout its existence the Fox has always had good movie projection and sound equipment. This is still true today even though films constitute only a small part of the total presentations. The theater's movie equipment consists of 35mm/70mm projectors with a Dolby CP200 processor, Altec speakers and Crown amplifiers to provide all formats, including 70mm magnetic 6-channel sound.

On the other hand, the house sound reinforcement system needed upgrading. When the Fox was converted to multipurpose use in 1974 it had only a minimal reinforcement system. This continued to be true as recently as last year. Plans had been made for eventually installing a reinforcement system in keeping with the Fox's other areas of technical excellence.

Patten and his crew assessed the performance characteristics of the numerous rental systems that had appeared at the theater over the years. One such system that had been used on several occasions was furnished by Jess McCurry, the Fox's house sound man. This system featured Pataxial PA150 loudspeakers. During a TEF workshop, comparative auditions were held between this loudspeaker and other popular types used in theater reinforcement. Patten was impressed by the naturalness of the Pataxial.

In 1985 the need for a house sound system was accelerated as a result of management negotiations for a special series of shows. The show's promoters required that the Fox install both a house sound reinforcement system and a house lighting system with the design and installation to be performed by outside companies of the promoter's choice. This was an unwise program for several reasons. The local stage crew, which would eventually be charged with operating the various systems, was not involved with the selection or installation. Patten, however, convinced the promoters' sound people to employ the Pataxial loudspeaker in their design.

## Sound system design

The design concept is basically a good one. It features a central cluster at the peak of the proscenium arch to cover the 1,898 seats in the loge, dress circle and balcony. A flown *house left* and a flown *house right* cluster provide either stereo or mono coverage of the 2,620 seats in the orchestra and the 163 additional seats in the pit when the orchestra pit is not used as such. Unfortunately, the designers decided to physically locate the power amplifiers within the flown loudspeaker cluster structures. This not only is in violation of the National Electric Code, but also introduces a host of other problems.

An amplifier failure during a performance cannot be remedied because access is not available. The cluster occupies much more space than is required by the loudspeakers alone and it becomes physically impossible to properly array the loudspeakers so that their patterns combine smoothly acoustically without holes either in the coverage pattern, the frequency response, or both. The designers and installers were conscientious and desired to do a good installation, but were handicapped by a lack of knowledge of the subtleties associated with arraying loudspeakers.

Their problems were compounded by: some electronic crossovers that would intermittently break into high-frequency oscillation with the subsequent destruction of high-frequency driver diaphragms, some power amplifiers that proved to be incendiary devices, and some equalizers that proved to be space heaters. The system operation proved to be less than satisfactory and at the conclusion of the original installation, the Fox was left holding the bag.

At this point, local management decided that the system should be evaluated by an acoustical consultant. An acoustical consultant (the author) who had both TEF instrumentation and experience with loudspeaker arrays was engaged to perform an overall system evaluation. The TEF measurements indicated severe combing as a result of physical offsets between the loudspeakers in each cluster with a multiplicity of interference notches having depths as great as 24dB.

It was apparent that the arrays needed to be redone, making use of appropriate

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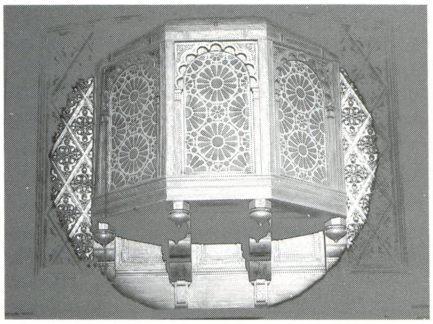
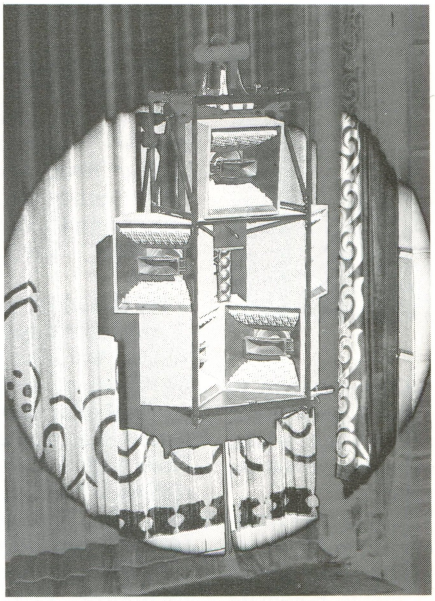
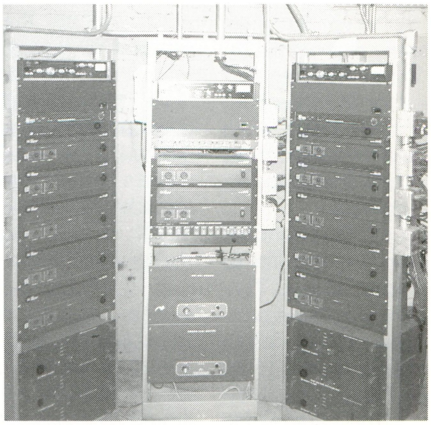
Patronis is professor of physics at Georgia Institute of Technology, Atlanta.



*A close-up of the center cluster.*



*A close-up of one of the side clusters.*



*The main equipment racks at the Fox.*

splaying and stacking techniques. At the same time, all of the system electronics except the system console equipment needed to be installed in an equipment room having appropriate access. This work was performed by the Fox staff and stage crew working under the consultant's direction. The performance schedule at the Fox required that this work be accomplished in several around-the-clock sessions.

The large monetary investment that the theater had already made in the system electronics prevented large-scale changes in this area. The oscillating crossovers and the equalizers were replaced with different, more reliable units, and dbx *over-easy* compressors were added. In the original system, the power amplifiers were at clip in order to achieve the desired performance levels. This same level could now be obtained with more than 10dB of headroom.

The stereo house left and house right clusters are each 4-way, consisting of two Meyer USW1 subwoofers, five Davis PA150 Pataxials (a coaxial 2-way loudspeaker) and four JBL2404 super-tweeters. The summed center cluster is a 2-way system consisting of two Davis PA150 Pataxials and two E-V HP4020 long-throw constant-directivity horns with E-V DH1 drivers.

The stage monitor system consists of two Turbosound TMS4 speakers for side fills, and eight JBL 4604B stage wedges. There is a capability for four on-stage mixes each with separate equalization. All loudspeakers are individually powered by either Crest 4001, JBL 6260, or JBL 6230 amplifiers. The house console is a Yamaha PM2000-32.

The genesis of the Fox reinforcement system was neither the usual nor the desired one, but the results have proven to be worthwhile. Since April the system has been employed successfully by a wide variety of shows, including a 1-week engagement by Bob Hope.

The replacement and upgrade of the Fox Theatre's sound equipment has brought it up to today's performance requirements and allows for various types of presentations. S&VC

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# GENE PATRONIS: TECH'S SILENT SOUNDMAN

## THE INSTITUTE

*By Russ Moore*
*Georgia Tech News Bureau*

Quick...What do Grant Field and two major meeting rooms in the White House have in common?

They were wired for sound by Georgia Tech professor of physics Dr. Eugene T. Patronis!

In 1972, Gene Patronis made a decision about the stadium sound system at Grant Field. As he tells it, "The performance of the system was not very good, and you ask yourself the question, What is the most prominent interface between Georgia Tech and the public in terms of numbers?'"

His answer: Football games.

His argument to the Athletic Association: "You can't control how the game is going to go, but at a university with Georgia Tech's reputation for technological excellence, the technical aspects of your stadium's sound system should be as good as you can possibly make them."

The Athletic Association agrees and asked Gene Patronis to design, build and install a new sound system at Grant Field.

So he did.

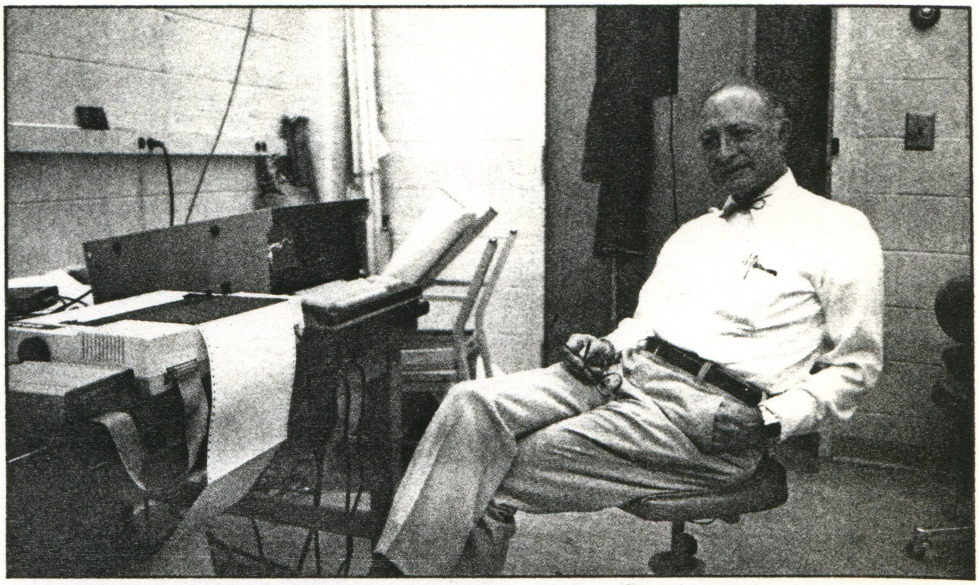
And then Clemson University asked him to do the same thing to their football stadium—"Death Valley"—and then later to their basketball coliseum. Then the University of South Carolina asked for and received a Patronis sound system for its football stadium. And when work is completed on the Alexander Memorial Coliseum later this year, the voice of P.A. announcer John Culver will boom through Gene Patronis' latest, and most modern, sound system.

Any others?

"Well," he admits, "Ohio State University asked me to submit a proposal and then picked somebody who had lots of help; they didn't believe one guy could do it all!"

Perhaps there were OSU spies at the South Stands in the summer of 1973 as Patronis assembled the custom-built Grant Field sound system, for he did indeed have help then—from an army of one: physics student Rick Gattoni (now a staff physicist at Scientific-Atlanta). That system, essentially still intact on the temporary tower in the south end zone, was "a labor of love, more than anything else" for Patronis. He laughs as he says, "I hauled every piece of that thing up there with a nylon parachute strap!"

Stadiums and coliseums are not the only landmarks that have benefitted from the Patronis magic, though. He performed the acoustical redesign of the Atlantic Civic Center, and speakers he designed for J.W. Davis & Co. make up the highly acclaimed sound system in Atlanta's Fox Theatre, touted most recently during reviews of the Broadway tour of "Cats."



**"This is my hobby," says physics professor Gene Patronis about his job at Tech. "I constantly tell my students that when I wake up, I can't wait to get to work; and if they go out and get a job where they don't have that feeling, they ought to be looking for another job!"** *Photo by Russ Moore*

And then, of course, there's the White House.

The White House Communications Agency, on the specific recommendation of someone who works for them regularly, contacted Patronis last year and asked him to design, build, and install a speech reinforcement system for the East Room and the State Dining Room, two geometrically identical areas in the White House. And unlike Ohio State, the White House wanted one man to do it all, "so they'd know who to blame if it didn't work," says a grinning Patronis. The systems were necessary because the acoustics in each room are extremely poor, which is particulary annoying in the East Room, where President Reagan holds his major press conferences.

Patronis built four loudspeaker clusters—two for each room—that are mounted in specially milled cabinets designed to blend in perfectly with each room's architecture. Thus camouflaged, the speakers are used at every press conference and are visible on television, but only if you look closely (the soundmen with the large boom usually stand right next to them).

One might wonder why a man with Patronis' experience in acoustics who is so much in demand (he is also a consultant for several audio equipment manufacturers) hasn't carved out a cozy niche for himself with a major firm.

Gattoni, who still helps Patronis maintain the Grant Field P.A. system at home games, has one answer: "Over the years Gene has done a number of things for Tech he didn't have to do, and he does it because he loves the school."

Patronis' own response is typically frank and revealing: "Well, if I was intersted in making money, I wouldn't have been here all this time."

And how long is "all this time?" Eugene T. Patronis left Quincy, Fla., to enroll at Georgia Tech as a freshman in physics in 1949 (passing up MIT, where he was also accepted, because "I couldn't even afford a winter wardrobe to live up in Cambridge."). He worked his way through school, repairing TV's and radios and building hi-fi systems for "rich Atlanta physicians." Only two years later, while still an undergraduate student, Patronis was also a teacher, conducting a class in radar and electronics for Air Force enlisted men at Southern Tech.

He earned his Bachelor of Science in Physics from Tech in 1953 and finished his course work and Ph.D. dissertation in atomic physics in 1957.

Patronis receives high marks from the White House on his work there (he built "the optimum" system possible, says one White House spokesman), and still more praise from his colleagues in acoustics ("He's one of the finest physics teachers in the U.S." says Don Davis, the author and audio consultant who runs Synergetic Auto Concepts).

But nothing reveals the true nature of Gene Patronis—his fine-tuned understanding of the delicate balance between theory and practice—like a story told by former student Gattoni. In 1974, Gattoni and Patronis reworked the electronics for the old South Stands scoreboard, making a junction box under the West Stands their access point for future maintenance. Still, as good as their new system was, problems cropped up constantly because employees of the phone company kept tinkering with the junction box between games, thus altering the scoreboard system. Gattoni remembers Patronis' creative solution to the problem.

"Gene got tired of it and stenciled in big red letters on the outside of the box, Danger: 4160 Volts,' and he never had a problem again!"

# Fox Sound System Comments

Firstly, any sound system which has been developed incrementally and contains elements dating from 1985 as is the case here can certainly be improved by equipment upgrades and perhaps overall redesign. This, however, does not require a start from ground zero.

In regard to the study by CDAI the following points should be considered.

## Acoustics.

A single reverberation time does not characterize the Fox auditorium. There are distinctly different values for the classical reverberation time when measured in the balcony, in the orchestra underneath the balcony, in the orchestra forward of the balcony, and in the stage house. Measurements of more significance with a sound system in place are those of STI or speech transmission index and %ALCONS or percentage of articulation loss of consonants. These values also would vary with location but will accurately characterize speech intelligibility in the particular locations.

## Film Projection Sound System.

The stage loudspeakers are erroneously described in the report. Three way loudspeakers augmented by sub-bass were installed about the time conversion to xenon arcs and automated projection were installed.

## Program Sound System.

The constitution and physical location of the signal processing and monitoring components as described in the report are completely different from that which existed upon my visit two years ago.

The stage loudspeakers are miss-characterized as regards to coverage angles.

The bridge loudspeakers are miss-characterized as regards to both coverage angle and the method by which they are energized.

The makeup of the central cluster loudspeaker array is completely erroneous. This cluster consists of two, two way full range loudspeakers supplemented by two large format 60 by 40 horns with high frequency drivers possessing two inch exits.

General.

The comments with regard to movie surround sound, auditorium noise levels, and the intrusion of street noise as well as concession noise are well taken. Additionally, the comments with regard to Audio System Inputs bear consideration.

The modern trend toward having left, center, and right loudspeakers to provide better imaging consistent with stage action is appropriate for small houses such as exist in New York. It is very difficult to obtain satisfactory imaging in a theatre of the size of the Fox. It is my opinion that it would be an aesthetic atrocity to install a bridge for mounting such an array in the Fox.

The report contains many opinions but no measured performance data.

ETO

# Sound Reinforcement at the Fabulous Fox

E. T. Patronis, Jr.

Georgia Tech

The Fox Theatre at 660 Peachtree Street in Atlanta, Georgia is one of the finest performing venues in the entire country. The presentations at the Fox cover the entire spectrum of the performing arts from rock to grand opera while currently averaging about 250 performances a year.

From its original conception, this remarkable edifice was neither Fox or theatre, but a headquarters for the Yaarab Temple of the Ancient Arabic Order of the Nobles of the Mystic Shrine (more commonly known as the Shriners). The financial realities existing in 1927 forced a "marriage of convenience" with movie potentate William Fox and the Fox Theatre opened on Christmas Day in 1929. For much of its history, the Fox operated as a grand movie palace but, by 1974, the changes in the entertainment industry in general and the movie industry in particular had the theatre doomed for the wrecking ball. Even in its declining years as a movie house the Fox had benefited from the unselfish efforts of appreciative citizens. In 1963, Joe Patten, the present technical director of the Fox, led a campaign to save the magnificent Moller organ at the Fox. He spent 10 full months restoring the organ. This successful campaign served as an example so that when the theatre was finally threatened with destruction in 1974 Patten along with other public spirited citizens formed Atlanta Landmarks, Inc. the non-profit organization which not only saved the Fox but also currently operates the theatre with outstanding success. In addition to operating the theatre, Atlanta Landmarks, Inc. maintains an ongoing program of restoration and refurbishment. Skilled craftsmen working from original drawings and designs are slowly making up for the years of neglect and lack of maintenance which were attendant with the last chapter of the Fox's movie house only history.

Throughout its existence the Fox has always had the finest in movie projection and sound equipment. This is still true today even though films constitute only a small part of the total presentations at the theatre. The theatre's movie equipment consists of 35 mm./70mm. projectors with Dolby CP200 processor, Altec speakers, and Crown amplifiers to provide all formats including 70 mm. magnetic six channel sound. A similar statement cannot be made with regard to the house sound reinforcement system. When the Fox was converted to multipurpose use in 1974 it had only a minimal reinforcement system. This continued to be true as recently as last year. Plans had been made for eventually installing a reinforcement system in keeping with the Fox's other areas of technical excellence. The Fox's technical director and crew had been assessing the performance characteristics of the numerous rental systems which had appeared at the theatre over the years. One such system which had been employed on several occasions was that furnished by Jess McCurry , the Fox's house sound man. This system featured Pataxial PA150 loudspeakers. During a TEF Workshop conducted at the Fox by Don and Carolyn Davis comparative auditions were held between this loudspeaker and other popular types used in theatre reinforcement. Joe Patten was impressed by the naturalness of the Pataxial as compared with the other speakers.

In 1985 the need for a house sound system was accelerated as a result of management negotiations for a special series of shows. The promoters required that the Fox have installed both a house sound reinforcement system and a house lighting system with the design and installation to be performed by outside firms of the promoters' choice. This was an unwise program for several reasons not the least of which was that no use would be made of the knowledge and experience of the local stage crew which would eventually be charged with operating the various systems. Joe Patten, however, was able to convince the promoter's sound people to employ the Pataxial loudspeaker in their design.

The design concept was basically a good one. It featured a central cluster at the peak of the proscenium arch to cover the 1,898 seats in the loge, dress circle, and balcony. A flown house left and a flown house right cluster to provide either stereo or mono coverage of the 2620 seats in the orchestra and the 163 additional seats in the pit when the orchestra pit was not used as such. Unfortunately the designers decided to physically locate the power amplifiers within the flown loudspeaker cluster structures. This not only is in violation of the National Electric Code but also introduces a host of other problems. An amplifier failure during a performance can not be remedied as access is not available. The cluster occupies much more space than is required by the loudspeakers alone and it becomes physically impossible to properly array the loudspeakers so that their patterns combine smoothly acoustically without holes either in the coverage pattern, the frequency response, or both. The designers and installers were conscientious and desired to do a good installation but were handicapped by a lack of the appropriate instrumentation and a lack of knowledge of the subtleties associated with arraying loudspeakers. Their problems were compounded by some electronic crossovers which would intermittently break into high frequency oscillation with the subsequent destruction of high frequency driver diaphragms, by some power amplifiers which proved to be incendiary devices, and by some equalizers which proved to be space heaters. The system operation proved to be less than satisfactory and at the conclusion of the original installation, the Fox was left holding the bag.

At this point it was felt by local management that the system should be evaluated by an acoustical consultant. An acoustical consultant who had both TEF instrumentation and experience with loudspeaker arrays in general was engaged to perform an overall system evaluation. The TEF measurements indicated severe combing as a result of physical offsets between the loudspeakers in each cluster with a multiplicity of interference notches having depths as great as 24 dB. It was apparent that the arrays needed to be redone making use of appropriate splaying and stacking techniques. At the same time all of the system electronics with the exception of the system console equipment needed to be installed in an equipment room having appropriate access. This work was performed by the Fox staff and stage crew working under the consultant's direction. The performance schedule at the Fox required that this work be accomplished in a timely fashion which necessitated nearly an around the clock schedule for several days. The large monetary investment which the theatre had already made in the system electronics prevented large scale changes in this area. The oscillating crossovers and the equalizers were replaced with different reliable units and dbx over easy compressors were added to the system however. At the conclusion of the work it was found that whereas in the original system the power amplifiers were at clip in order to achieve the desired performance levels this same level could now be obtained with over 10 dB of head room.

The stereo house left and house right clusters are each four way consisting of two Meyer USW1 subwoofers, five Davis PA150 Pataxials (a coaxial two way loudspeaker), and four JBL2404 supertweeters. The summed center cluster is a two way system consisting of two Davis PA150 Pataxials and two EV HP4020 long throw constant directivity horns with EV DH1 drivers. The stage monitor system consists of two Turbosound TMS4 speakers for side fills and eight JBL 4604B stage wedges. There is a capability for four onstage mixes each with separate equalization. All loudspeakers are individually powered by either Crest 4001, JBL 6260, or JBL 6230 amplifiers. The house console is a Yamaha PM2000-32.

The genesis of the Fox reinforcement system was neither the usual nor the desired one but the results have proven to be worthwhile. Since April the system has been employed successfully by a wide variety of shows not the least of which was a one week engagement by Bob Hope. At the conclusion of his run, Mr. Hope publicly congratulated the Fox on its excellent sound system and told the audience that Atlanta should be proud of the Fox. Atlantans are proud of the Fox and its facilities because they saved the Fox not only for themselves but for all of us.

# The Fabulous Fox
# House Sound System Specifications

### House Console
Yamaha PM-2000-32

### House Equalization
The house has been equalized on a one third octave basis such that at the orchestra mixing position, the house curve is flat to within plus or minus 3 dB from 40 Hz to four kilohertz with a 3 dB per octave roll off beyond four kilohertz. A UREI 546 stereo four band parametric equalizer is provided at the console for special effects.

### Speaker System
Stereo, flown stage left and stage right clusters with summed center cluster for balcony. Each side cluster consists of five PA150 Pataxial loudspeakers, two Meyer USW1 subwoofers, and four JBL 2404 supertweeters. The speakers are arrayed to provide uniform coverage with a minimum of interference effects. The center cluster consists of two PA150 loudspeakers and two EV HP4020 horns.

### Power Amplifiers
All loudspeakers are individually powered by either Crest 4001, JBL 6260, or JBL 6230 amplifiers.

### Monitor System
Two Turbosound TMS4 for side fills and eight JBL 4604B stage wedges. There is a capability for four onstage mixes with equalization.

### Microphones
10 Shure SM57
12 Fender M1
4 Shure SM81
2 EV RE20
5 Countryman 85DI
8 Shure SM58
8 Sennheiser MD421
3 Shure SM87
2 Crown PZM30GPB

### Microphone Stands
20 Atlas MS12C straight stands
2 Atlas MS12S clutch type solo stands
4 Atlas DS7 desk stands
6 Atlas TS8 12″-20″ banquet stands
5 goosenecks 19″, 5 goosenecks 13″, 4 goosenecks 6″
14 AKG KM211 black telescoping boom arms
8 AKG KM255 long telescoping booms

### Cable
Ten 100′, thirty 50′, forty 25′, and thirty 10′ with XLR3 connectors.
Four 20′ and six 5′ with phone to phone connectors.

### Intercommunications
David Clark single channel main station, seven beltpacks, and seven headsets. The theatre is hard wired for both channels in spotlight booth, Hub board, balcony rail, sound console, lighting console, stage left, upstage right, and downstage right. The dressing room monitors include program feed and announce microphone.

### Additional Equipment
Yamaha C200 cassette deck with pitch control and Dolby noise reduction.

### Compressor-Limiters
Four DBX 160X and two DBX 166.

### Effects Rack Patching
The DBX compressors and noise gates route through RTS phone plugs on a multi-connector. They are labeled such that the plug marked "in" mates with the jack marked "in" on the source equipment being connected. The UREI 546 is normal through to the patch panel and thus can be used with any bus, output, or interstage module which is compatible.

# Pataxial Loudspeaker

The Pataxial loudspeaker system offers a level of performance previously unattainable in a live sound reinforcement environment with commercially available systems. The system was designed by E.T. Patronis, Jr., Ph.D., who, during his career as a professor of physics at Georgia Tech, has created an astonishing number of audio devices which are now being marketed by the most well known and respected companies in the field. The Pataxial incorporates several truly unique design features, all directed toward one goal: uncompromised sound reproduction in an easy-to-use format. The Pataxial system consists of a 15 inch high-power woofer in a tuned vent enclosure which is fronted by a short exponential horn and a coaxially mounted sectoral high frequency horn with a heavy duty compression driver. A phase aligned crossover provides for a smooth transition throughout the critical crossover region, maintaining a well-defined acoustic image and producing a transition behavior which is free of amplitude and phase errors. The combination of coaxial loading and phase aligned crossover results in the only commercially available sound reinforcement loudspeaker which is temporally coincident throughout its coverage area. Far from being an esoteric technical consideration, this characteristic produces as a direct result a complete absence of the "smeared" acoustic image which is present to a clearly audible degree in other systems. The directional behavior of the low and high frequency horns is closely matched throughout the crossover region, and the low frequency horn's pattern control extends to 125 Hertz allowing for unsurpassed control of feedback, in most cases with no equalization whatever.

**Eugene T. Patronis, Jr.**
**School of Physics**
**Georgia Tech**
**Atlanta, Georgia 30332-0430**
Telephone: (404)894-5237
Facsimile: (404)875-0125
1999 March 1

# Invoice

Fox Theatre
660 Peachtree St., N.W.
Atlanta, Georgia 30365

February 26, 1999: Correct improper assembly of stage left loudspeaker stack. Adjust equalization of stage left loudspeaker stack. Two hours at $125.00 per hour.

| | |
|---|---|
| Total this invoice | $250.00 |

THE FOX THEATRE
FOX
ATLANTA GEORGIA

WAR

# CHECK REQUEST

**FROM:** Wendy Riggs **DATE:** 3/2/99

**PAYABLE TO:** Eugene Patronis
School of Physics
Georgia Tech
Atlanta, GA 30332-0430

Please include complete address, with zip code!

**AMOUNT OF CHECK:** $250.00

**REASON FOR CHECK:** Sound Maintenance

**CHECK SHOULD BE:** **MAILED** ______ **RETURNED TO:** ______

**NEEDED BY:** ______

**ACCOUNT TO BE CHARGED:** ______
To be filled out by Accounting

If you need a check by a specific date and time, please note this on the form.
All reimbursements requests must be accompanied by a paid receipt.

NOTE: While it only takes a few minutes to type a check, obtaining signatures may take some time. Please allow for sufficient time when making a request.

Please call Joyce at 881.2028 if you have any questions.

660 PEACHTREE STREET NE ATLANTA, GEORGIA 30365 (404) 881-2100 FAX (404) 872-2972

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FROM: 01/01/96                                                         TO: 05/31/00
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================================================================================
History Activity
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 036419  010305   07/23/98    05541    STAGE REP     PAYMENT             -900.00
 013331  013331   03/04/99             REPAIRS       INVOICE              250.00
 038699  013331   03/05/99             REPAIRS       PAYMENT             -250.00

TOTALS History Activity
     PURCHASES:             4,275.00
     PAYMENTS :             4,275.00
     DISC TAKN:                 0.00
     TAX AMT  :                 0.00

TOTALS All Business
     PURCHASES:             4,275.00
     PAYMENTS :             4,275.00
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